IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): An apparatus which performs a plasma process on a target substrate by using plasma, comprising:

an airtight process chamber which accommodates the target substrate;

a gas supply system which supplies a process gas into the process chamber;

an exhaust system which exhausts an interior of the process chamber and sets the interior of the process chamber to a vacuum state;

first and second electrodes arranged in the process chamber to oppose each other, an RF field, which turns the process gas into plasma by excitation, being formed between the first and second electrodes;

an RF power supply connected to one of the first or second ~~electrode~~ electrodes through a first interconnection and configured to supply RF power;

a matching circuit arranged between said one of the first and second electrodes and the RF power supply on the first interconnection and configured to serve to automatically perform input impedance matching relative to the RF power;

an impedance setting section provided in addition to the matching circuit and arranged between said one of the first and second electrodes and the matching circuit on the first interconnection, the impedance setting section being configured to ~~set a backward-direction impedance as an impedance against an RF component including~~ adjust a resonance state thereof relative to a higher harmonic of a fundamental frequency of the RF power, ~~and~~ which is input from the plasma into [[to]] the first interconnection, and thereby set an impedance against the higher harmonic, the impendence setting section being ~~predetermined member,~~ ~~and~~ capable of changing a higher harmonic to be treated as a resonance target ~~value of the backward-direction impedance~~; and

a controller which supplies a control signal ~~concerning a preset value of the backward direction impedance to~~ for controlling the impedance setting section to control a characteristic of a plasma process performed in the process chamber,

wherein the impedance setting section comprises:

an impedance change unit connected to the first interconnection through a shunt and configured to select a higher harmonic as a resonance target, and

a filter disposed on the shunt between the first interconnection and the impedance change unit and configured ~~to select a higher harmonic as a resonance target and~~ to cut ~~a component having~~ off the fundamental frequency of the RF power.

Claim 2 (Cancelled).

Claim 3 (Currently Amended): The apparatus according to claim 1, wherein the controller controls the impedance setting section to set the impedance ~~preset value is set in advance~~ such that a planar uniformity of the plasma process on the target substrate is improved.

Claim 4 (Currently Amended): The apparatus according to claim 1, wherein the ~~preset value is set in advance~~ controller controls the impedance setting section to set the impedance such that the plasma stabilizes.

Claim 5 (Cancelled).

Claim 6 (Currently Amended): The apparatus according to claim 1, wherein the impedance change unit comprises one or both of an arrangement which continuously changes

the ~~backward direction~~ impedance with a continuous variable element, and an arrangement which changes the ~~backward direction~~ impedance stepwise by switching a plurality of fixed elements.

Claims 7-10 (Cancelled).

Claim 11 (Currently Amended): The apparatus according to claim 1, wherein ~~the~~ a value of ~~the input~~ an impedance ~~is so set~~ formed by the impedance setting section ~~as to be~~ against the RF power is not less than twice a value of an RF load impedance formed by the process chamber and the plasma against the RF power.

Claims 12-17 (Cancelled).

Claim 18 (Currently Amended): The apparatus according to claim [[12]] 1, wherein the filter has a high impedance of not less than 50Ω against harmonics other than a selected harmonic.

Claim 19 (Currently Amended): The apparatus according to claim [[12]] 1, wherein the filter comprises a filter selected from the group consisting of a high-pass filter, bandpass filter, low-pass filter, and notch filter.

Claims 20-27 (Cancelled).

Claim 28 (Currently Amended): The apparatus according to claim [[26]] 1, further comprising:

a second RF power supply ~~which is arranged on the second interconnection and which supplies~~ connected to the other of the first and second electrodes through a second interconnection and configured to supply second RF power; and

a second matching circuit ~~which is~~ arranged ~~on the second interconnection~~ between ~~the second electrode~~ said other of the first and second electrodes and the second RF power supply ~~and which automatically performs~~ on the second interconnection and configured to serve to automatically perform input impedance matching relative to the second RF power.

Claim 29 (Currently Amended): The apparatus according to claim 28, wherein the ~~first~~ RF power supplied by the RF power supply connected to said one of the first and second electrodes is a first RF power which has a frequency higher than that of the second RF power.

Claim 30 (Currently Amended): The apparatus according to claim [[29]] 28, wherein the ~~first~~ RF power supplied by the RF power supply connected to said one of the first and second electrodes is a first RF power which has a frequency lower than that of the second RF power.

Claims 31-40 (Canceled).

Claim 41 (Currently Amended): The apparatus according to Claim 1, wherein the impedance setting section is configured to adjust a circuit defining the ~~backward direction~~ impedance to resonate with at least one of higher harmonics.

Claims 42-44 (Cancelled).

Claim 45 (New): An apparatus which performs a plasma process on a target substrate by using plasma, comprising:

an airtight process chamber which accommodates the target substrate;

a gas supply system which supplies a process gas into the process chamber;

an exhaust system which exhausts an interior of the process chamber and sets the interior of the process chamber to a vacuum state;

first and second electrodes arranged in the process chamber to oppose each other, an RF field, which turns the process gas into plasma by excitation, being formed between the first and second electrodes;

an RF power supply connected to the first electrode though a first interconnection and configured to supply RF power;

a matching circuit arranged between the first electrode and the RF power supply on the first interconnection and configured to serve to automatically perform input impedance matching relative to the RF power;

an impedance setting section directly connected to the second electrode through a second interconnection, the impedance setting section being configured to adjust a resonance state thereof relative to a higher harmonic of a fundamental frequency of the RF power, which is input from the plasma into the second interconnection, and thereby set an impedance against the higher harmonic, the impedance setting section being capable of changing a higher harmonic to be treated as a resonance target; and

a controller which supplies a control signal for controlling the impedance setting section to control a characteristic of a plasma process performed in the process chamber,

wherein the impedance setting section comprises an impedance change unit connected to the second interconnection and configured to select a higher harmonic as a resonance target.

Claim 46 (New): The apparatus according to claim 45, wherein the impedance change unit comprises one or both of an arrangement which continuously changes the impedance with a continuous variable element, and an arrangement which changes the impedance stepwise by switching a plurality of fixed elements.

Claim 47 (New): The apparatus according to claim 45, wherein a value of an impedance formed by the impedance setting section against the RF power is not less than twice a value of an RF load impedance formed by the process chamber and the plasma against the RF power.

Claim 48 (New): The apparatus according to claim 45, further comprising:

a second RF power supply connected to the second electrode through the second interconnection and configured to supply second RF power; and

a second matching circuit arranged between the second electrode and the second RF power supply on the second interconnection and configured to serve to automatically perform input impedance matching relative to the second RF power.

Claim 49 (New): The apparatus according to claim 48, wherein the RF power supplied by the RF power supply connected to the first electrode is a first RF power which has a frequency higher than that of the second RF power.

Claim 50 (New): The apparatus according to claim 48, wherein the RF power supplied by the RF power supply connected to the first electrode is a first RF power which has a frequency lower than that of the second RF power.

Claim 51 (New): The apparatus according to claim 45, wherein the impedance setting section is configured to adjust a circuit defining the impedance to resonate with at least one of higher harmonics.

Claim 52 (New): The apparatus according to claim 45, wherein the impedance change unit is connected to the second interconnection through a shunt.

Claim 53 (New): The apparatus according to claim 52, wherein the impedance setting section comprises a filter disposed on the shunt between the second interconnection and the impedance change unit and configured to cut off the fundamental frequency of the RF power.

Claim 54 (New): The apparatus according to claim 53, wherein the filter has a high impedance of not less than 50Ω against harmonics other than a selected harmonic.

Claim 55 (New): The apparatus according to claim 53, wherein the filter comprises a filter selected from the group consisting of a high-pass filter, bandpass filter, low-pass filter, and notch filter.